This chapter is concluded by twenty-three problems and questions referring to weights and measures and specific gravities. Throughout the book temperatures are expressed in centigrade degrees, and the metrical system is employed. Next, we have chapters on fundamental chemical relations and molecules, and the relations of the latter to heat. Chapter IV. treats of Atoms, and Chap. V. of Chemical Notation. Under this head we observe several definitions and modes of formulation which are not usual in this country. Thus chemical reactions are divided into three classes, analytical, synthetical, and metathetical, the latter including double decomposition, displacement, and re-arrangement. The symbols are usually printed in italics, but solid bodies are formulated in "full-faced" type, and gases in skeleton type; and when reactions take place in aqueous solution this is expressed in the equation by including the dissolved bodies in brackets with the symbol Aq: thus, $(Ca\,Cl_2 + H_2O + Aq)$ shows that the calcic chloride is in solution, and that the quantity of water represented by H_2O is a result of reaction. In the chapter on Stochiometry (though Stoichiometry seems more correct) are a number of modes of calculation of formulæ, and of the relations between weight and volume; and under Chemical Equivalency is a kind of constitutional formulæ which somewhat differs from those in general use. Professor Cooke follows the principle laid down by Dr. Frankland that chemical formulæ should represent, as far as possible, the relations existing between the atoms of a compound; but he has thought it advisable to place the grouping element or radical at the end of the formula instead of the beginning; this, we think, is to be regretted, as it adds another to our already numerous modes of formulation. Short strokes are placed at the side of the grouping element or radical to indicate the direction of the attractions; thus the formula for Ethylacetamide is $H, C_2\,H_5, C_2\,H_3\,O \equiv N$, showing that the hydrogen, ethyl, acetyl, are united directly to the nitrogen, the commas indicating that they are not united among themselves: Diethylurea $H_2, (C_2\,H_5)_2, \equiv N_2 = C\,O$ is another instance. When these short strokes become numerous they are rather confusing, as in Turquoise, $O_3 \equiv [Al_2]_2 \equiv O_6 \equiv (P\,O_2)$. Graphic formulæ of Kekulé's and Crum Brown's form are explained, and students are advised to make frequent use of them, but not to abuse them. The nomenclature employed is that which is frequently used in England, and which Mr. Cooke designates as that of the London Chemical Society, though we think that some of the Fellows disapprove of such terms as zincic sulphate, &c. The physical relation of chemical bodies, as crystallography, electrolysis, spectrum analysis, and heat of chemical combination, are treated at some length. The elements are divided into sections according to their atomicity, the perissads being taken first and afterwards the artiads. This arrangement places oxygen beyond the middle of the book, instead of near the commencement as usual. The occurrence, mode of preparation, and properties, of the elements, and of their more important compounds, are very concisely given. Carbon is described as occurring in three forms, diamond, graphite, and *coal*. This last term seems an unfortunate one for amorphous carbon, as some coal contains as little as 73 per cent. of the element. Under the compounds of carbon is a section on Organic Chemistry which extends over only sixty pages Although it contains a vast amount of information, and organic compounds are mentioned throughout the book, yet it seems rather a meagre account of the enormous developments of this branch of science. At the end of the book are tables of French measures and weights, of elements, of the specific gravities of gases and vapours, and of logarithms and antilogarithms. We wish this book success, as it indicates great vitality in Transatlantic chemistry.

OUR BOOK SHELF

Elementary Treatise on Natural Philosophy. By Professor A. Privat Deschanel, of Paris. Translated and edited, with extensive additions, by Prof. Everett, D.C.L., of Belfast. In 4 parts. Part 1—Mechanics, Hydrostatics, and Pneumatics. (London: Blackie and Sons.)

THIS translation of Prof. Deschanel's "Traité de Physique" will, we believe, be found extremely useful. An elementary treatise of moderate size on Physics has been long wanted in our schools. Atkinson's translation of Ganot, or Brook's Natural Philosophy, is too expensive for general use, and of smaller books, none, so far as we know, are good. The issue of Dr. Everett's translation in parts at the moderate price of 4*s.* 6*d.*, will enable it to be largely employed. The engravings with which the work is illustrated are especially good, a point in which most of our English scientific works are lamentably deficient. The present part contains Mechanics, Hydrostatics, and Pneumatics. The clearness of Deschanel's explanations is admirably preserved in the translation, while the value of the treatise is considerably enhanced by some important additions. Thus, to Deschanel's description of the pendulum is added a short account of the condition of isochronous vibration, moment of inertia, momentum, and kinetic and potential energy. In the section on Pneumatics, Deschanel's extremely good description of the air-pumps of Hawksbee, Bianchi, Kravogl, Geissler, and Deleuil, is supplemented by an account of Sprengel's mercurial pump. It is possible to point out defects, but they are few. The conception of "mass" is always a difficult one for a beginner. Deschanel gives a very clear explanation, which is not reproduced, the term being employed without explanation. Nor do we understand why, instead of Deschanel's statement that the co-efficient of absorption of ammonia in water at 0°C. is 1050 (exactly it is 1150), it is said to be only 600. But these are minor defects, and we repeat that we believe the book will be found to supply a real need. W. M. W.

The Wild Garden; or, Our Groves and Shrubberies made beautiful by the Naturalisation of Hardy Exotic Plants. By W. Robinson. (London: Murray.)

THIS little volume forms a fitting sequel to Mr. Robinson's admirable book, "Alpine Flowers for English Gardens," which we noticed some time back.* It does not contain nearly such a large amount of novel information, but will nevertheless be of great value to all lovers of their gardens. The book is a protest against the practice which commenced some twenty years since, and reached its height a year or two back, of throwing the whole energies of the gardener into producing large masses of colour by the use of what are termed "bedding plants," to the exclusion of the cultivation of the individual flower. This somewhat barbaric taste has resulted in the gradual disappearance from our gardens of many flowers which had been "household words" since the time of Shakespeare, to the great detriment, as Mr. Robinson considers, of gardening as a real art, and to the enormous increase of its expense.

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* NATURE, vol i. p. 603.

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Our great traveller and naturalist, Mr. Wallace, says, that "during twelve years spent amidst the grandest tropical vegetation, he has seen nothing comparable to the effect produced on our landscapes by gorse, broom, heather, wild hyacinths, hawthorn, and buttercups." Mr. Robinson's aim is to make our gardens as beautiful as our hedgerows and woods; and to this end he would not have his favourite plants placed together indiscriminately in a bed; but, as far as possible, he would imitate the natural *habitat* of each species, and for this he gives full instructions in each case. Half the volume is occupied by a list of hardy exotic plants suitable for naturalisation in our woods, semi-wild places, shrubberies, &c., with directions for their cultivation; and we hope it may assist in again bringing the public taste to the culture of flowers beautiful not only in themselves, but from the historic associations connected with many of them. A. W. B.

Die Kleinschmetterlinge der Umgegend Münchens und eines Theiles der bayerischen Alpen. Von August Hartmann. 8vo, pp. 96. (Munich, 1871: E. Lotzbeck.)

THIS is a catalogue of the Micro-Lepidoptera of the neighbourhood of Munich, and of a portion of the Bavarian Alps, with indications of the plants on which the larvæ of the different species have been found feeding and of the times and places at which the species have occurred. In his Introduction the author describes the method which he adopts for killing and preparing the delicate little moths which form the subject of his book, and from this the collector of Micro-Lepidoptera may gain some important hints. He also notices especially the curious moths belonging to the group of Psychidæ, and those Tineidæ which resemble them in habits; and he fully confirms the statements of Von Siebold as to the occurrence of parthenogenesis in *Solenobia triquetrella* and *lichenella.* W. S. D.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his Correspondents. No notice is taken of anonymous communications.*]

Eozoön Canadense

IT is now about five years since a series of communications to the Geological Society of London by Logan, Dawson, Carpenter, and Sterry Hunt, announced the discovery of organic remains in the Laurentian rocks of Canada. They were decidedly interesting, not only as attempting to show that the belts of limestone interpolated in the great beds of Laurentian Gneiss were organic in their origin, but also from the *art* which the authors displayed in the mode of placing their views before the public. The realistic manner in which the fossil *Eozoön canadense* is drawn as it were from the *life*, coupled with the fixed belief in most men's minds that limestone is necessarily organic in its origin, predisposed many to accept the theory without much inquiry. The reputation of Dr. Carpenter as a physiologist was alone considered sufficient to settle the matter. These views did not, however, long remain unchallenged, for in the following year Professors King and Rowney, in a communication "On the so-called Eozoönal Rock," detailed the elaborate investigations by which they arrived at the conclusion that the presumed fossil was purely a mineral production. The replies that naturally followed were literally little more than reiterations of previous statements, excepting in the important admission from Dr. Carpenter, that the several features (that is chamber casts, canal system, and proper walls) could be separately paralleled elsewhere. He, however, took his stand upon the combination of the whole found in the Canadian specimens. To the fatal objection that all had been obtained from metamorphosed rocks Dr. Dawson replied by producing a specimen from Tudor, Ontario, which Sir W. E. Logan goes no further than to declare is from *comparatively* unaltered limestone, but which Dr. Dawson considers furnishes a conclusive answer to all arguments drawn from metamorphism. Since then I am not aware that any further evidence in favour of the organic hypothesis has been made public. On the other hand, Professors King and Rowney announced in a paper, read before the British Association at the Liverpool meeting, that they had discovered the features of the so-called organism in the Ophite of Strath in the Isle of Skye, an altered sedimentary deposit of the Liassic age, in which evidence of its mineral origin was conclusively proved. Here, at present, the matter rests; but in my opinion ample materials exist for forming a judgment, not by reliance on authority but by independent reasoning. With this object in view, and with your permission, I will proceed to detail a few of the facts of the case. Before doing so I would, however, call attention to the strange absence of any allusion to obvious objections which characterises the first series of papers, and to the persistent begging of the question involved in constantly speaking of the specimens as undoubted fossils. The adoption of this objectionable practice under authority of such eminent names is prejudicial to an impartial judgment, as it indirectly influences the mind. I am quite willing to admit that there existed sufficient reasons for suspecting them to be fossils, but I submit that it is not philosophical to state so distinctly before a thorough examination of all the objections. For evidence of this having been done I search these papers in vain. How then can any one, accustomed to scientific methods of investigation, help suspecting that under all this scientific and pictorial use of the imagination there exists or lurks a fallacy?

First, then, the specimen from Tudor has to be disposed of; nor will this be difficult, for it is altogether a lame affair. It is admittedly not from an unaltered rock, so it is difficult to see even how it bears on the question. The distinctive features are also obscure, and the chambers not of the usual form and proportion. To call this *Eozoön canadense*, and then bring it forward as closing the discussion, is an amusing piece of controversial skill. When it is more certainly co-ordinated with the original specimens, it will be time to discuss it. I simply ask, would it have been pronounced organic had it been the only variety discovered? I think not.

The broad fact then remains unshaken that in unaltered rocks no Eozoönal structures have yet been discovered. On the other hand, in metamorphosed rocks such structures are abundant, and even Dr. Gümbel, of the Bavarian Survey, a believer in Eozoön, has been much mystified by finding its features in impossible places. Not only do we find it in the Laurentians, but in rocks of a much later date, but curiously only in those that have undergone alteration. If it be an organism, then hydrothermal action, it seems, is necessary to its development, not as one would suspect during life, but ages after its entombment in sedimentary deposits.

The prevailing infilling material of the "chamber casts" representing "the sarcode body of the animal," is also admittedly serpentine or some analagous mineral—a mineral that forms the basis of no known fossil, consequently we are to assume that at each period of the animal's existence, either the conditions were different to those under which others were fossilised, or that the original infilling has since been replaced by serpentine; and this, be it said, must always have happened in those rocks afterwards selected for metamorphism.

Again, as minerals of this description are never found in unaltered rocks, we must be prepared to believe in the curious coincidence of the same rocks, and only these, having, at periods widely separated in point of time, been selected for the preservation of the organism and the deposit of these minerals. Either we must do this, or be prepared to show that metamorphism must necessarily change the infilling of the "chamber casts" to serpentine. Which supposition is the wildest?

Still further, we must believe that not only has Nature so miraculously preserved her pet animal, but that she has also imitated the fossil organism in the same minerals in an altered rock, in a manner to justify such acute observers as Professors King and Rowney in considering the imitation identical with the thing itself. For in the altered portion of the rock at Strath, before referred to, we have the features of the Eozoön, while the unaltered portion, which it gradually shades off into, teems with characteristic Liassic fossils. Have these fossils been obliterated in the altered portion, or have we the Eozoön again conterminous with the metamorphism?

And, in conclusion, we must further admit that all these conditions have been fulfilled over wide areas and at periods remotely separated with unerring regularity whenever the Eozoön has made its appearance. Is not this an improbability amounting to the impossible? For my part, this negative evidence far

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